

**Compositions and Methods for Enhanced Sensitivity
and Specificity of Nucleic Acid Synthesis**

Abstract

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The present invention relates to nucleic acid inhibitors, compositions and method for enhancing synthesis of nucleic acid molecules. In a preferred aspect, the invention relates to inhibition or control of nucleic acid synthesis, sequencing or amplification. Specifically, the present invention discloses nucleic acids having affinity for polypeptides with polymerase activity for use in such synthesis, amplification or sequencing reactions. The nucleic acid inhibitors are capable of inhibiting nonspecific nucleic acid synthesis under certain conditions (e.g., at ambient temperatures). Thus, in a preferred aspect, the invention relates to “hot start” synthesis of nucleic acid molecules. Accordingly, the invention prevents, reduces or substantially reduces nonspecific nucleic acid synthesis. The invention also relates to kits for synthesizing, amplifying, reverse transcribing or sequencing nucleic acid molecules comprising one or more of the nucleic acid inhibitors or compositions of the invention. The invention also relates to using the inhibitors of the invention to prevent viral replication or treat viral infections in a subject. Thus, the invention relates to therapeutic methods and pharmaceutical compositions using the inhibitors of the invention. The invention thus may be used for *in vivo* and *in vitro* inhibition of nucleic acid synthesis and/or inhibition of polymerase activity.